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Filed : August 18, 2003

### REMARKS

Claim 1 has been amended to clarify the invention. Support for the amendment can be found at page 8, lines 18-21, and page 9, lines 10-26, for example. Claims 8-34 have been added. Support for Claims 13 and 24 can be found at page 10, lines 1-16, for example. Support for Claims 8, 16, and 27 can be found in Example 2 on page 15, for example. Support for Claim 9 can be found in Examples 1 and 3-6 on page 14-17, for example. Support for Claims 11, 12, 22, 23, 33, and 34 can be found on page 5, lines 24-25 of the specification, for example. No new matter has been added. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

#### Rejection of Claims 1-7 Under 35 U.S.C. § 102 or § 103

Claims 1-7 have been rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over JP 03-056433 ("Masasane"). Applicant submits herein a full translation of Masasane for the Examiner's information and respectfully traverses the rejection.

The Examiner asserts:

"[In Masasane,] the catalyst is not disclosed as containing sodium oxide."

The Examiner appears to assert that the catalyst of Masasane is completely pure simply because impurities are not mentioned. Masasane does not mention not only sodium oxide but also any other impurities. As explained in the instant specification (pages 7-9), activated alumina contains impurities such as silica, iron oxides, sodium oxides, etc. One of ordinary skill in the art could not reasonably be expected to draw an inference that the catalyst of Masasane does not contain sodium oxide simply because Masasane is silent about sodium oxide. The Examiner cites Murai et al. (US 4,560,807) which shows that  $\gamma$ -alumina catalyst contains 0.08% Na<sub>2</sub>O. However, none of the prior art references teaches or suggests that activated alumina has a sodium oxide content of 0.07% or less.

Further, the Examiner asserts:

"However, even if it does contain sodium oxide the instant invention would still be considered obvious over the teaching of Masasane et al. because generally, differences in concentration will not support the patentability of subject matter

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encompassed by the prior art unless there is evidence indicating such concentration is critical.”

However, "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). See also M.P.E.P. § 706.02(j). Masasane does not teach or even suggest a step of removing sodium oxide from  $\gamma$ -alumina catalyst. Masasane clearly fails to recognize the relationship between the sodium oxide content and the conversions ratio when the average pore radius falls within a specific range (2.5 nm to 8.0 nm). There is no implicit suggestion in Masasane to reduce the sodium oxide content to 0.07% or less when the average pore radius is 2.5 nm to 8.0 nm in order to increase the conversion ratio. No prior art teaches or suggests importance of the sodium oxide content in activated alumina when catalyzing the vapor phase converting reaction of methanol. Because the Examiner fails to show a prior art reference at least teaching activated alumina having a sodium oxide content of 0.07% or less or the step of removing sodium oxide from activated alumina, this rejection could not be maintained.

A declaration of Satoshi Terai accompanying this amendment clearly shows that among the parameters, the  $\text{Na}_2\text{O}$  content is critical, and further when the  $\text{Na}_2\text{O}$  content is about 0.07 wt% or less, the conversion ratio reaches about 70% or higher (see Figs. 1-4). These surprising and unexpected results are in no way taught by the prior art.

Lastly, the Examiner asserts:

“The comparative data presented in the instant invention is not sufficient to avoid this rejection because the comparison is not being made with the closest prior art. For example, none of the comparative data utilize an average pore radius within the 5-8 nm range disclosed by Masasane et al.”

However, the instant specification shows the following examples and comparative examples:

	$\text{N}_2\text{O}$ (wt%)	Average pore (nm)	Surface area ( $\text{m}^2/\text{g}$ )	Pore volume (ml/g)	Conversion ratio (%)
Ex. 1	0.02	6.48	115	0.37	75
Com. Ex. 1	0.25	6.05	117	0.35	41

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As can be seen from the above, Comparative Example 1 corresponds to Example 1, except for the  $\text{N}_2\text{O}$  content, wherein Comparative Example 1 utilized an average pore radius within the 5-8 nm range disclosed by Masasane. The conversion ratio in Comparative Example 1 is significantly lower than that in Example 1. The Examiner's assertion is erroneous.

Additionally, in Masasane, the layer of the catalyst had a thickness of 31.8 cm (see Example 1 wherein 100 mL of the catalyst was loaded in a stainless fixed bed reactor with an inner diameter of 20 mm), and the maximum temperature of the catalyst was  $325^\circ\text{C}$ , whereas in Examples described in the present specification, the layer of the catalyst had a thickness of 2.5 cm (5 mL of the catalyst was loaded in a stainless fixed bed reactor with an inner diameter of 16 mm), and the uniform temperature of the catalyst was  $290\text{-}310^\circ\text{C}$ ). Because the thickness and the temperature are significantly different, the conversion ratio of Masasane could not be compared with those in the claimed invention (it is commonly known in the art that when the temperature is higher, the conversion ratio becomes high).

In view of the foregoing, Claim 1 as amended herein and dependent claims could not be anticipated by or obvious over Masasane. Applicant respectfully requests withdrawal of this rejection.

#### Rejection of Claims 1-4, 6, and 7 Under 35 U.S.C. § 102 or § 103

Claims 1-4, 6, and 7 have been rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over US 4,595,785 ("Brake"). Applicant respectfully traverses the rejection.

The Examiner asserts:

"[N]one of the comparative data utilize a sodium oxide content of zero as disclosed by Brake."

The Examiner appears to assert that the catalyst of Brake is completely pure simply because impurities are not mentioned. Brake uses hydrochloric acid and then washes free of chlorides a mixture of  $\text{TiCl}_4$  and sodium alumina with water (col. 2, lines 16-25). However, this process is not related to removal of  $\text{Na}_2\text{O}$ . As discussed above in relation to Masasane, one of ordinary skill in the art could not reasonably be expected to draw an inference that the catalyst of

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Brake does not contain sodium oxide simply because Brake is silent about sodium oxide. There is absolutely no reasonable basis to draw an inference that the sodium oxide content in Brake is zero. The Examiner is required to identify a reference showing a sodium oxide content of zero because it is clearly impractical (Murai et al. (US 4,560,807) cited by the Examiner which shows that  $\gamma$ -alumina catalyst contains 0.08%  $\text{Na}_2\text{O}$  is not sufficient).

Brake does not teach or even suggest a step of removing sodium oxide from  $\gamma$ -alumina catalyst. Brake clearly fails to recognize the relationship between the sodium oxide content and the conversions ratio.

Further, Brake uses a mixture of titania/alumina. In the claimed invention, the catalyst requires no active component other than the activated alumina, and in Claim 5, that aspect is specifically recited.

In view of the foregoing, Claim 1 as amended herein and dependent claims could not be anticipated by or obvious over Brake. Applicant respectfully requests withdrawal of this rejection.

#### New Claims

Claims 8-34 have been added. Claims 8-12 depend ultimately from Claim 1, and at least for this reason, as with Claim 1, Claims 8-12 are patentable. Claim 13 is independent and recites limitations similar to those in Claim 1. Claims 14-23 depend ultimately from Claim 13. Thus, Claims 13-23 are patentable. Claim 24 is independent and more clearly recites the relationship between the sodium oxide content and conversion ratio. Claims 25-34 are depend ultimately from Claim 24. Thus, Claims 24-34 are patentable.

#### CONCLUSION

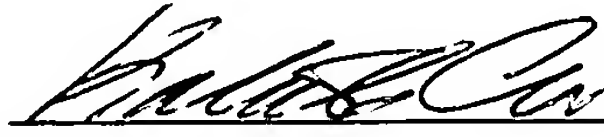
In light of the Applicant's amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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